Researchers at the University of South Florida have developed a drug delivery system by synthesizing nanoparticle vesicles embedded in a chitosan hydrogel that allows the tumor-targeting drug chlorotoxin to be entrapped internally.

Chemotherapy is used after surgery to treat any residual tumors. However, adjuvant chemotherapy suffers from non-specific distribution of drugs, have severe side effects, and most chemotherapeutic drugs require multiple administrations which significantly increases the costs associated with treatment. Various drug delivery systems have been developed to lessen the toxicity and improve the efficacy of drugs by allowing direct delivery to specific targeted sites, but these systems often have the difficulty of entrapping a high concentration of a drug which causes the drug to leak into its surroundings. An enhanced drug delivery system is therefore needed to improve the delivery of drugs to tumor cells.

USF inventors have synthesized niosomes embedded in a chitosan hydrogel with encapsulating capabilities of the drug chlorotoxin. The biodegradable chitosan material allows for targeted delivery of the drug while chlorotoxin binds preferentially to tumor cells and not to healthy cells. In addition, specific modifications to the delivery system allows for a fine-tuned release rate while the incorporation into the chitosan hydrogel can prevent the migration of noisome away from tumor sites. This technology will further enhance current drug delivery alternatives for the treatment of cancer and be of great benefit to patients.

**ADVANTAGES:**
- Slow, extended release of drug
- Specific targeting of tumor cells
- Low cost

**Alternative Approach To Chemotherapy**

**Greater Specific Interaction Between Hydrogel (green) and Ovarian Carcinoma (OV2008) Compared to Normal Ovarian Cells (MCC)**

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